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Security InformationAN ANALYTICAL FRAMEWORK FOR A STUDY OF ECONOMIC WARFARE AS
APPLIED TO THE EAST-WEST TRADE PROBLEM1. General Considerations

Discussion of the East-West trade problem has frequently been carried on in terms of irrelevant side issues or outright fallacies. The purpose of this paper is to establish a general frame of reference in which this and similar Economic Warfare problems can be analyzed.

It should be evident at the start that in terms of economic welfare both the East and the West gain from trade - or conversely, that both will lose from a cessation of trade. Countries or regions will engage in trade only if the foreign money price of a commodity - converted by an exchange rate - is lower for the importing country than it would be if the importing country were to produce the same commodity itself. This money price differential masks either a comparative or an absolute advantage in terms of "real" costs. This difference in real costs means that a country could not obtain the same volume (or kind) of commodities as they now import if they were forced to produce them domestically, i.e., the factors of production now being used in the export industries could not produce the same volume of imports as the country now obtains by exchanging exports for imports.

If it were true that both East and West planned their economic activity solely in terms of maximizing economic welfare, there would be no apparent advantage from severing trade. If trade were to be severed, economic welfare in the West (as well as in the East) would be lower than before. The East and West are concerned, however, with "strategic welfare" as well as with general economic welfare. The strategic welfare of the West is measured by the military potential of the West relative to the military

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potential of the East. Any increase in strategic welfare for the West must, by definition, imply a decrease in strategic welfare for the East.^{1/} From this line of reasoning, it follows that if both East and West were interested solely in strategic welfare, trade between the two areas would take place only under special circumstances. If both sides had perfect knowledge of the intentions, capabilities, and vulnerabilities of the other, trade would not take place at all. Any trade that would result in an increase in strategic welfare for one side would be bound to decrease the strategic welfare of the other, and the side that was made relatively worse off would refuse to play the game.

Perfect knowledge of intentions, capabilities, and vulnerabilities implies not only that both sides have all the necessary facts about the other but also that both sides have plans for military activities that are mutually consistent. If one side misjudges the intentions of the other, or if either side is planning to fight a different kind of war than the other, then either side might believe that it would be increasing strategic welfare by trading with the other. For example, the West might assume that Western Europe could be defended after two years of preparation but would be easily overrun now. Further, the West might assume that continued wheat imports from the Bloc would be necessary in order to maintain a level of industrial production sufficiently high to produce the required amount of defensive armaments. Since the Bloc is already strong enough to overrun Western Europe now, additional supplies of strategic commodities (say rubber) might

^{1/} It should be noted that an increase in strategic welfare for the West (East) is consistent with a decrease in the "absolute" military potential of either or both sides.

be considered to be worth less to the Bloc than the wheat exports of the Bloc are worth to Western Europe. On the other hand, the Bloc might assume that ^{the} defense of Western Europe could not be improved significantly with two years of additional preparation. Then any supplies of wheat shipped to the West would only go to build up a Western Europe which would be taken over by the Bloc anyway, and the rubber received in return would increase the present military superiority of the Bloc vis-a-vis Western Europe. Both sides would be willing to trade under such circumstances, since each believes that it is increasing strategic welfare.

Other circumstances in which trade would take place because of different intentions are fairly common. Suppose that the West anticipated the mass production of tactical atomic weapons which would render tanks obsolete. Then it would be to its advantage to ship the Bloc all the tank-making material that it could sell, in return for any materials which could be used in producing atomic weapons. The Bloc, on the other hand, might be planning to make use of tanks as a major weapon of its military strategy. Both sides would again be willing to trade, each believing that it was increasing strategic welfare.

Trade would also take place if the side that could gain by trade restrictions found that the cost of initiating and enforcing the restrictions outweighed the gain. This factor of enforcement cost might also carry some weight in determining whether "selective" controls are better than "across the board" controls. An embargo on a commodity which has greater strategic value than the average for all traded commodities would by definition be more damaging (per unit controlled) than an indiscriminate

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embargo; but the administrative burden^{2/} could outweigh this gain.

If we modify the original assumption that both East and West are interested solely in increasing "strategic welfare," we have a third reason why trade might be justified. Either area might have a twofold objective, e.g., to increase their strategic welfare and to maintain their economic welfare. Then it would be profitable for either area to engage in trade in order to maintain the level of their economic welfare, even at the cost of a smaller increase in strategic welfare than would otherwise be possible.

Use of this criterion (strategic welfare) for purposes of policy implies that we have some method of making at least qualitative estimates of the way in which strategic welfare will vary under different policies. Since strategic welfare is measured by relative military potential, attention must be diverted to measurement of changes in military potential and to measurement of changes in the capabilities of the economic system, one of the more important foundations of military potential. Considerable time and energy has been spent in developing what is usually called the "bottle-neck" approach to measuring economic capabilities. It is argued that

^{2/} Some of the elements of cost which would make this burden significant are:

- (a) Intelligence organization man-hours - analysis of the strategic value of particular commodities, formulation of licensing arrangements, accounting mechanisms, etc.
- (b) Policing and patrolling manhours and transportation equipment.
- (c) Administrative organization manhours necessary to keep track of results.

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commodity X or Y is indispensable - without it production of end-items A and B cannot continue. This approach seems to be a blind alley. Many of the items that are now imported by the East (West) can be produced domestically. The reason they are not at present is that it is cheaper (in terms of real costs) to produce the wheat, coal, etc. for export in exchange for commodities whose domestic production cost is high. Even for those items which cannot be produced domestically, it is usually possible, again at higher costs, to use a substitute commodity. Synthetic rubber can be used in place of natural, steel can be substituted for copper in some uses, and aluminum silicate can be substituted for industrial diamonds in some uses.

Another fallacy that obscures the real issues consists of a presumption that the "strategic" importance of an item depends on (a) its direct usefulness to the military establishment, and (b) its closeness to the end-item stage of production. This presumption disregards the inter-relatedness of the economic system. Rifles can be banned from export to the Bloc, and cotton allowed to proceed. But the resources freed from the necessity of producing this cotton might produce more rifles than the Bloc would have been able to import - with some time lag. The same argument can be applied to the effect of cutting off supplies of any commodity which forms a link in the chain of production relationships. From a long-run point of view, it matters little whether we were to reduce shipments of airplanes, of machine tools used in stamping aluminum parts, of steel used in the production of machine tools, of cobalt used to temper the steel, or of food required by the cobalt workers. Cutting off any of these items would eventually result in a reduction of airplane output if no counterbalancing measures were taken.

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On the other hand, the "strategianness" of specific military goods or of end-items does depend in part on time perspectives. If the amount of cobalt in the industrial pipeline were sufficient to enable production of alloy steel (at the current rate) to continue for one year, cutting off all supplies of cobalt would not reduce the rate of alloy steel production until after one year. Hence, to the extent that a war of limited duration is expected to begin in the immediate future, the strategic importance of a commodity may depend in part on its direct usefulness to the military establishment or to its closeness to the end-item stage of production.

Up to this point, we have not indicated what criteria can be used to determine the "strategianness" of an item. This is in part a question of the specificity of the commodity in regard to military and civilian uses. Regardless of any other factor, an item which can be utilized either directly or indirectly by the military establishment is likely to be somewhat strategic. Items such as face powder and rubber balloons are not likely to be strategic under any circumstances, since their contribution to the military establishment is nil.

The level of civilian consumption also determines in part whether an item is strategic or not. Some minimum consumption level is required to prevent deterioration of the input "manpower," which is essential to the production of all commodities. Consumer goods which form part of this minimum consumption level are obviously strategic commodities. Generally speaking, it may be said that an item is strategic if a reduction in its availability causes a reduction in (absolute) military potential. It follows that any item - produced or imported - is strategic if consumption

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in the Bloc (West) is at the irreducible minimum, since loss of the item would cause either a direct reduction in the output of some commodity geared to the military establishment, or an indirect reduction in some outputs because of a decline in productivity.

Other factors must be brought out in order to indicate the relative "strategicalness" of those commodities that have some strategic characteristics. The ease or difficulty with which an item can be substituted for is highly significant in this context. If the West were to cut off an item now imported by the Bloc, such as spare parts for machinery built to Western specifications, it may mean that this machinery in the Bloc would become useless as it broke down and required repair, since a substitute part produced in the Bloc might ruin the machine if tolerance limits were too broad. Construction of extensive capital facilities might be needed to replace natural rubber by synthetic production. The training of thousands of technicians and scientists might be required to replace the "know how" received as a by-product of machinery imports. These criteria for determining the relative "strategicalness" of commodities can be expressed in terms of one common denominator - the range of real costs required to produce the commodity. It should be noted that this criterion for determining "strategicalness" has no necessary relationship to the direct military usefulness of the item, or its closeness to the end item stage of production.

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2. Peculiarities of the East-West Trade Problem:

In order to place the East-West trade problem in proper perspective, it is important to have some idea as to the over-all significance of the trade. Exports to the Bloc totaled roughly 1.5 billion dollars in 1950, contrasted to a GNP in the Bloc of some 125 billions. Exports from the Bloc were also roughly 1.5 billion dollars, which is insignificant compared to GNP in the West. These figures do not properly reflect the importance of trade in particular commodities. This is a question of strategic importance, as defined by the above criteria. It is evident that the Bloc will undergo a considerable loss--particularly in the long run--if the supply of Western technology is cut off. Some of the goods currently being obtained by the Bloc embody the results of over a hundred years of technological experimentation and development. The consequences of this loss might be staggering.

The strategic importance of particular commodities depends in part on the way in which East and West are defined. For every commodity now traded by either area, there exists a world supply curve which rises sharply as world production increases, because of unequal factor endowment and uneven stages of technological development. If the entire low-cost section of this supply curve lies in one of the two areas, then the other area will suffer severe damage from the trade restriction, particularly if demand for the commodity is strong. Under the assumption that the world is divided into two parts, the East and the West, domestic production of Bloc exports by the Western country now receiving the exported commodity will not have to be undertaken in most cases. The country now receiving the Bloc export will use foreign sources of supply not quite so cheap, since for almost

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every commodity now exported by the Bloc it appears to be true that there is a substantial section of the low-cost part of world supply outside the Bloc. Thus, the cost of replacing Bloc exports would be considerably lower than if all countries now receiving Bloc exports had to either produce them domestically or go without. The same possibilities for obtaining low-cost replacement of imports is probably not true of the Bloc. We can assume this partly because the diversity of resources and the present level of technology in the Bloc is not as suited to production adjustments as it is in the West. The higher cost of replacement also reflects in part the inheritance of past development. The capital resources of the West are substantially greater than those of the Bloc, particularly in the non-strategic sectors of the economy. Most of the additional capital equipment and facilities needed by the West for import replacement can be met by converting existing capital now being used in relatively non-strategic sectors. Most of the capital requirements of the Bloc can be met only by diverting resources to new construction.

Other peculiar characteristics of the East-West trade problem have been noted before. The assumption that the objective of the Bloc is the maximization of military potential, while the West is partly interested in economic welfare, means that any loss for the Bloc would be reflected in a direct reduction of military potential, while the loss to the West would be partly absorbed in sectors of the economy that do not contribute to the military establishment. Another way of stating this difference is in terms of a "cushion" of resources not contributing to "strategic welfare." The size of this cushion depends on the amount of resources in the economy

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devoted directly or indirectly to supporting the military establishment. At first glance it might appear that the cushion in the West is far greater than in the East, since absolute living standards are much higher and non-essential production is greater. However, "non-essential" production in this context really means production that could be curtailed without having any effect on the incentive to produce. Absolute living standards are not useful as a basis of comparison, since what matters is the level of the standard of living relative to what people think is a minimum level. It might be true that cutting off production of television sets would reduce US productivity as much as a cut in the bread ration would reduce USSR productivity. We can probably assume, however, that the size of the cushion in the West is greater than in the East.

One other interesting feature of the problem should be noted. A trade restriction policy amounts to setting up a barrier to the normal flow of goods. It will thus always be profitable in the short run to attempt circumvention of this barrier. One of the methods by which the Bloc can minimize losses is to smuggle in goods formerly imported from the West, while one of the costs to the West is that of making the barrier more smuggle-proof. This is one burden of the restriction policy which falls exclusively on the area initiating and enforcing the restrictions. The restricted area will only smuggle in goods to the extent that it is cheaper than domestic production.

3. Methods of Measuring Relative Damage.

In order to estimate the relative damage on both sides, it is necessary to know the volume of trade that will be carried on for the period under

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discussion. This is necessary because we cannot measure the damage resulting from a trade cessation unless we know what the trade would have been in the first place. For simplicity, we can assume that the problem is to measure the damage from a complete cessation of trade, and that the volume of trade that will be moving in 1952 would continue to be maintained in subsequent years if the cessation policy were not initiated. We then need estimates of "trade that would have taken place between the Bloc and non-Bloc world in 1952." This estimate presumably includes both recorded and clandestine trade. It could be obtained for recorded trade by projecting trade volumes for the latter part of 1951 and taking into account any change due to the effects of current trade negotiations.

The clandestine trade estimate is more difficult. Calculations of the total volume and value of clandestine trade have never really been made, but might be done in the following roundabout manner. From spot reports and information about covert shipments we could estimate the relative magnitude of the amounts of the most important commodities known to be moving in clandestine trade. Using recorded trade data and other sources, we could then estimate the total amount of means of payment that can be used for illegal procurement. For this estimate we would have to know:

- (1) The trade balance of the Bloc.
- (2) Changes in gold holdings and current gold production rate.
- (3) The amount of non-recorded exports to the West from the Bloc.
- (4) Net short and long term capital movements.
- (5) Net balance of "invisibles" on current account.

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Considering this total as an estimate of the over-all value of clandestine shipments, we could convert the relative volume figures above to relative value figures by means of prices paid per unit, and prorate the relative values on the basis of the (known) total value.

Having thus estimated the volume of "trade that would have taken place," we can proceed to measure damage to each area by assuming that all trade is cut off. It is evident that readjustments in the production pattern of both areas will take place, involving losses and gains in terms of input resources.

Domestic production of goods formerly imported will increase, probably not to such an extent as to equal the previous total of imports plus domestic production. The cost of this expansion of production may be expressed as X units. Part of the cost will involve capital expenditure, which can be measured as resource cost in the period of construction, plus depreciation, defined as the quantity of resources required to maintain the capital at constant efficiency. We can express this cost as X_c . The other part of this cost will consist of direct inputs of labor and materials, which will probably vary as the new capital equipment comes into use. While the necessary capital is in the process of construction, the direct cost per unit of output will presumably be higher than after construction is completed, since the additional "doses" of labor and materials into the existing capital will not yield as high an output per unit as the same doses applied to newly constructed capital. We may express this cost as X_d .

Production of goods formerly exported will decrease, and the resources will be transferred to the uses mentioned above. The extent and nature of this transference will be determined by the relative efficiency of these

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resources in occupations where expansion of production is important. The relative efficiency of the resources, in turn, is determined partly by the length of time considered as having elapsed in estimating an annual damage figure. Given more time, unskilled labor can be trained and shifted to new locations, and new techniques can be developed to make better use of the change in the relative scarcity of resources. The value of the resources thus released from exporting may be expressed as Y units.

Production of goods neither imported nor exported would fall off somewhat. This must occur if the quantity of resources required to increase domestic production of imports were greater than the quantity of resources released from exporting. Inasmuch as trade existed in the first place, this condition must hold. It would be impossible to pinpoint these losses in terms of end-items without complete knowledge of the demand and cost functions of all Bloc products, so we can measure them up by their counterparts--the basic resources needed to reproduce the imports minus the resources released from exporting.

For some of the commodities formerly imported, domestic production will not be undertaken at all because the cost is too high, or, as mentioned above, total supply will drop off because it is only worth while to produce some fraction of the imports. Valuing these imports by domestic production costs will overstate the damage, since they will not be produced. The alternative methods of evaluation would consist of (1) valuing the end-products that were formerly produced with the help of the imports, and then adjusting this figure to take account of all the resources--other than the imports--that were needed in the production of these end-items, or (2) valuing the amount of input resources which the Bloc would be willing to use in order to increase domestic production of the imports to the point where it equaled

previous production plus imports. In case (1) above, the cost can be expressed as $Z - Y^1$, where Z is the value of the end-items and Y^1 is the value of all other inputs. In case (2), the cost can be expressed as X^1 .

The total damage figure can then be expressed as either:

$$(1) X_c + X_q + Z - Y^1 - Y, \text{ or}$$

$$(2) X_c + X_q + X^1 - Y.$$

The units in which these costs are expressed may or may not be additive, but they could be made so by using monetary units throughout and expressing them all in the same currency.

The damage figures for the East and the West are not directly comparable, as was noted by previous discussion. We can safely assume that the loss to the Bloc in terms of input resources will be almost entirely "strategic damage," i.e., direct reduction of military potential in the broadest sense. This assumes that civilian consumption is at an irreducible minimum for the cold war. The cost to the West in terms of input resources will not be entirely in terms of "strategic" damage. A good part of the total resources used in the West are channeled into production which satisfies individual wants, but which can hardly be considered essential. It follows that some of the damage to the Western economies can be absorbed in the "non-essential consumption" sectors, and will not be "strategic" damage.

The estimate of the damage derived from the above line of reasoning may be seriously overstated if other than internal sources of supply are available for previously imported goods. The possibility of both East and West obtaining goods from within their own areas by normal trade patterns has already been discussed, and we concluded that the West

should be able to obtain almost all of the present Bloc exports by this method. We also concluded that this was probably not true of the Bloc. However, other possibilities exist.

The damage estimate for the Bloc would be modified considerably if commodities now being imported by the Bloc and having high domestic production costs were allowed to filter through the restrictions to any great extent. This could be important in two ways. Commodities formerly imported may be secured in semi-legal fashion through transshipment and re-routing in Western Europe, or through countries not in sympathy with the restriction policy. This would mean that the resource cost of increasing domestic production of the item would not be relevant to calculation of the damage. Instead, the cost of producing the means of payment for the imports would be the effective "cost of production." The commodities formerly imported could also be secured by smuggling, provided this cost were lower than domestic production costs.

These possibilities of external procurement make it necessary to increase the cost to the restricting area, since the cost of imposing and maintaining restrictions must be considered. The more obvious costs in this category are the manpower costs of patrolling and policing areas through which trade normally proceeds--highways, railroads, water routes, etc. The other significant element consists in the administrative cost involved in planning and carrying out restrictions, obtaining information, issuing and examining licenses, and keeping track of all the myriad papers that are usually necessary for such policies.

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4. The Problem of Time Perspectives in the East-West Trade Project

All of the adjustments to the restriction policy have time dimensions. Reallocation and shifting of resources, training labor, building capital, readjusting plans, etc. cannot be accomplished immediately.

A minimum - long-run - damage figure can be calculated by assuming that sufficient time is allowed to complete all the readjustments visualized. This implies that the respective areas are operating on long-run production functions, and that no further changes at the margin will yield a more satisfactory pattern of rates of output and stocks of equipment. The "long-run" might be somewhat of the order of five years. We could then total up the amounts of resources needed as complementary inputs for the production of imports from new and existing capital, the depreciation and maintenance on new capital calculated over the life of the equipment ("t" years), and the value of the reduction in the annual rate of supply of goods formerly imported. Subtracting the amounts of resources formerly used for the production of exports, we can express "long-run" damage as

$\frac{X_c}{t} + X_x + X' - Y$. This expression gives no indication of the annual damage before the "long-run" is reached.

A maximum damage figure can be constructed by using different assumptions. We can assume that all necessary capital is constructed and in operation immediately, and that all regaining, shifting, and production increases are achieved immediately. Then the total cost of the transition period would be compressed into the first year after restrictions. We could

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then total up the cost of constructing capital, the cost in complementary inputs of increasing production in new and existing capital, and the value of the imports not being replaced, and subtract the resources formerly used for exports. This would give us $X_c + X_e + X' - Y$. The estimate

for any year after year one would be the same as the long-run estimate above.

A damage figure in annual rates from impact to long-run can be constructed by making assumptions about the developmental pattern of capital construction, the way in which rates of output of the former import vary over time, the rate of absorption of released and reallocated resources, and so forth. The total cost involved in any pattern of construction less intense than the maximum damage pattern above must be less than the cost of this (maximum) pattern, since there must be some optimum pattern of building and reallocating that will yield the lowest discounted cost over any given time span. It is most unlikely that this optimum pattern would consist of the sort of intense activity assumed in the maximum damage pattern.

The damage estimate - in the short-run - might require modification for those imports which have been stockpiled. If the stockpiles have been accumulated for use in the event of trade restrictions, then the short-run damage resulting from restriction of this import will be zero, except for the cost incurred because of the stockpiling process. For as long as the stockpile holds out, depletion of stocks is the same as continued importation of the commodity. If the stockpiles have not been accumulated for this purpose, the Bloc (West) has a choice between reducing a stockpile which has been accumulated for other "strategic" purposes, or losing the production of the end-items which use the stockpiled input. Since the Bloc (West) did not choose

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to increase production of the end-item when they had both the import and the stockpile, any reduction in stocks would mean only a diffusion of the damage.

These damage estimates are based on present technology and methods.

It is therefore possible for either area to reduce the amount of resources needed for import replacement - in the long-run - by concentrating technical, scientific, and managerial resources in the import replacement industries. Such mobilization of technical "know how" could cause a drastic lowering of the entire cost function. However, the apparent saving in resources to the Bloc should be almost balanced by the increased costs of the slower rate of technological progress in those industries from which the skilled resources were drawn. If, as seems likely, the supply of such skilled resources is severely limited. This presumption probably would not apply to the West.

The damage estimate assumes that the replacement of imports will have no effect on other sectors of the economy aside from the question of which sector will lose the basic resources necessary to increase production of imports. This would not be true if we consider all the "costs" of replacing such items as machinery prototypes, and spare parts for Western machinery. In the case of prototypes, the Bloc has been securing the equivalent of years of technical and scientific labor with each machine. If these items were to be cut off, the Bloc would have a choice between reducing the rate of current investment so that sufficient resources to maintain the current rate of technical progress would be released, or slowing down the rate of technical progress to maintain current investment. This reduces to a choice between the relative quantity of present investment and the relative quality of future investment. The loss involved here may not be too significant for several years, but might well be the single most important effect of the trade restrictions in the long-run.

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5. Similarities of the East-West Trade Problem to other Capabilities Problems

In the last analysis, capabilities can be reduced to quantities of resources, stocks of equipment and "know how" - which can be considered as a labor resource plus an organizational technique. Any reduction in the quantity of these resources can, in principle, be translated into alternative reductions in end-items by means of production functions and engineering calculations. Trade restrictions really amount to the removal of a certain block of resources. This becomes evident if we consider that the present rates of output are achieved by utilizing trade as a device to obtain greater total output with a given amount of resources. The cessation of this trade means that resources must now be reallocated, and the allocation after cessation cannot yield as desirable a pattern of output rates as before - or it would have been used before. Therefore, the Bloc (West) will either have to be satisfied with lower rates of output (and/or stocks of equipment) for some commodities, or it will have to employ more total resources.

In estimating that certain rates of output will be reduced by the trade restrictions, we are implying that no more total resources can be brought into use. This is true in a strict sense, if we consider "leisure" as one output of the economy. However, leisure can be reduced in favor of increased man-hours with no immediate effect on capabilities. If carried on over a long enough period, however, reduction in the rate of output of this "commodity" might have serious repercussions.